



## 12. Radio Frequency Exposure

### 12.1 Applicable Standards

<input type="checkbox"/> §1.1307(b)(3)(i)(A)	The available maximum time-averaged power is no more than 1 mW, regardless of separation distance.																																															
<input type="checkbox"/> §1.1307(b)(3)(i)(c)	ERP is below a threshold calculated based on the distance, R between the person and the antenna / radiating structure, where $R > \lambda / 2 \pi$ .  TABLE B.1—THRESHOLDS FOR SINGLE RF SOURCES SUBJECT TO ROUTINE ENVIRONMENTAL EVALUATION <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th colspan="2">RF Source Frequency</th> <th colspan="3">Minimum Distance</th> <th>Threshold ERP</th> </tr> <tr> <th><math>f_L</math> MHz</th> <th><math>f_H</math> MHz</th> <th><math>\lambda_L / 2\pi</math></th> <th></th> <th><math>\lambda_H / 2\pi</math></th> <th>W</th> </tr> </thead> <tbody> <tr> <td>0.3</td> <td>–</td> <td>1.34</td> <td>159 m</td> <td>–</td> <td>35.6 m</td> <td>1,920 R<sup>2</sup></td> </tr> <tr> <td>1.34</td> <td>–</td> <td>30</td> <td>35.6 m</td> <td>–</td> <td>1.6 m</td> <td>3,450 R<sup>2</sup>/f<sup>2</sup></td> </tr> <tr> <td>30</td> <td>–</td> <td>300</td> <td>1.6 m</td> <td>–</td> <td>159 mm</td> <td>3.83 R<sup>2</sup></td> </tr> <tr> <td>300</td> <td>–</td> <td>1,500</td> <td>159 mm</td> <td>–</td> <td>31.8 mm</td> <td>0.0128 R<sup>2</sup>f</td> </tr> <tr> <td>1,500</td> <td>–</td> <td>100,000</td> <td>31.8 mm</td> <td>–</td> <td>0.5 mm</td> <td>19.2R<sup>2</sup></td> </tr> </tbody> </table> <p>Subscripts L and H are low and high; <math>\lambda</math> is wavelength. From § 1.1307(b)(3)(i)(C), modified by adding Minimum Distance columns.</p>	RF Source Frequency		Minimum Distance			Threshold ERP	$f_L$ MHz	$f_H$ MHz	$\lambda_L / 2\pi$		$\lambda_H / 2\pi$	W	0.3	–	1.34	159 m	–	35.6 m	1,920 R <sup>2</sup>	1.34	–	30	35.6 m	–	1.6 m	3,450 R <sup>2</sup> /f <sup>2</sup>	30	–	300	1.6 m	–	159 mm	3.83 R <sup>2</sup>	300	–	1,500	159 mm	–	31.8 mm	0.0128 R <sup>2</sup> f	1,500	–	100,000	31.8 mm	–	0.5 mm	19.2R <sup>2</sup>
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<input checked="" type="checkbox"/> § 1.1307(b)(3)(i)(B)	Device operates between 300MHz and 6GHz and the maximum time-averaged power of effective radiated power (ERP), whichever is greater, $\leq P_{th}$ .  $P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$ <p>Where</p> $x = -\log_{10} \left( \frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right) \text{ and } f \text{ is in GHz;}$ <p>and</p> $ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$ <p><math>d</math> = the separation distance (cm);</p>																																															



12.1 EUT Specification

<b>Frequency band (Operating)</b>	<input checked="" type="checkbox"/> WLAN: 2412MHz ~ 2462MHz <input type="checkbox"/> WLAN: 5150MHz ~ 5250MHz <input type="checkbox"/> WLAN: 5250MHz ~ 5350MHz <input type="checkbox"/> WLAN: 5470MHz ~ 5725MHz <input type="checkbox"/> WLAN: 5725MHz ~ 5850MHz <input type="checkbox"/> Bluetooth: 2402MHz ~ 2480MHz
<b>Device category</b>	<input type="checkbox"/> Portable (<20cm separation) <input checked="" type="checkbox"/> Mobile (>20cm separation)
<b>Antenna diversity</b>	<input type="checkbox"/> Single antenna <input checked="" type="checkbox"/> Multiple antennas <input type="checkbox"/> Tx diversity <input type="checkbox"/> Rx diversity <input checked="" type="checkbox"/> Tx/Rx diversity
<b>Evaluation applied</b>	<input type="checkbox"/> Blanket 1 mW Blanket Exemption <input checked="" type="checkbox"/> MPE-based Exemption <input type="checkbox"/> SAR-based Exemption

12.2 Test Result

Channel Frequency (MHz)	Max. Conducted output (dBm)	Max. Tune up power (dBm)	Antenna Gain (dBi)	Max. Tune up e.r.p. Power (dBm)	Max. Tune up e.r.p. Power (mW)	Limit (mW)
2412-2462	22.67	23.17	3	24.02	252.12	3060

Maximum Permissible Exposure (Co-location)

Modulation Type	Channel Frequency (MHz)	Max. Conducted output power (dBm)	Max. Tune up power (dBm)	Antenna Gain(dBi)	Distance (cm)	Max. Tune up e.r.p. Power(mW)	Limit (mW)	MPE Ratio
GFSK	2402-2480	16.33	16.83	3.00	20.00	58.61	3060.00	0.02
11g	2412-2462	22.67	23.17	3.00	20.00	252.12	3060.00	0.08
Co-location Total								0.10
ΣMPE ratios Limit								1.00

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